

121 in the growth of ecological thinking, though this history is older.

But when we say that it has paralleled ecological thinking, we do not mean that the approach should be identical or even similar. In ecology, the plant or animal, as an individual or in association, is studied as part of the community of plants and animals, whose own growth may be encouraged or hindered by the growth and competition from others. When we study human cultures, this functional approach breaks down. It is not enough to show the context of each cultural trait in the whole, indispensable as this may be. This might produce a satisfying interpretation but it would suffer from important omissions. These are the history of the culture and the periods of contact and isolation that may have characterized it and the changes that the culture has made in the physical environment in which it is placed. No place in the world offers such fruitful illustrations over so great an area and over so long a period of time as Southeast Asia, with the exception of the Mediterranean. The great changes in the soils due to paddy culture and the long fertilisation from human excreta and plant residues, soil erosion, deforestation, the minute changes of land from mountain tops to the cultivated valleys can be found in abundance here.

121 This study of three villages on the island of Okinawa is concerned
181 with many of these themes. As the inquiry progressed and during the period
182 of reflection that followed the collection of materials, it seemed that
the most significant characteristic was the existence of the family system,
and that this had meaning not only in the places where one would expect it,
such as family and daily life, and in the desire to respect the memory of
the dead and to guard against extinction of the family line, but that its
influence was the key to an understanding of the way in which the culture
had changed and modified the natural environment and utilized the resources
available to it.

The connecting link between the family system, on the one hand, and
the use of the natural environment, on the other, is the system of inheritance,
and through the inheritance system on land tenure and land use.
And when speaking of land tenure and land use, the reference is not merely
to the agricultural land, but to all land, including the forest soils of
the north, the uncultivated land scattered over the island, but so vital
in its production of grasses to the livelihood of peoples.

121 One of the most striking aspects of this culture is its dependence on
181 plants, not only for food, but for uses other than food. Houses, their
824 roofs and sidings, plank floorings, excepting only the stones; fibres or
wood for sandals or clogs; grasses, cane stalks, shrubbery for fuels; imported
cottons for clothing, which have replaced an earlier dependence on
reeds or banana leaves; fibres and reeds for rugs and floor mats; rice
stalks or other grasses for making carrying baskets; rope of palm or of
rice stalks; wooden poles, are but a few illustrations of this close
dependence on plant life. It is a culture based on the utilization of
plants for all purposes to which are added the multifarious and skillful
employment of stone and of water.

The village is one of a series of settlements in a long narrow valley, on a limestone plain, bordered on the east by a steep ridge, up to 300 feet in elevation and running in a northwest and southeast direction, which divides the valley from the sea. On these cliff like formations, large outcrops are covered with shrubs and miscanthus grass. Lanes and roads lead from the valley floor to the summits of these hills, where villagers collect their firewood and grass for roof thatch. On the rocky, steep slopes of this seaward ridge, above the line of cultivation, is the tomb area. Precipitous and stony hills prevent cultivation, but occasionally a sharp tongue of land reaches far up the slope, its end protected from the rains and wash by a short stone fence.

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Between Gushichan and Hanashiro village, there is a bridge over a small stream, its upstream course obscured by its dispersion in the rice fields. The dirt road, gradually ascending, cuts through the main rice growing area of the village, on a gentle slope, reflected in the bench cultivation of the rice fields. Here and there are large rocks and stony outcrops, with an occasional scrub pine, cycad, or a covering of miscanthus. Cultivation goes around these large stones.

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The road, about one-fourth of a mile from the bridge, soon leads into what looks like, from a distance, a densely wooded area. This is the settlement.

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With the exception of the rough stony land of the limestone mountains and steep slopes, the soils of the area are the Okinawa clay loams and the Chinen stony clays lying on the limestone plains. The farm and village area takes up approximately 427 acres, of which 257 are in gently sloping Okinawa clay loams, a deep, well drained, neutral to slightly acid and very fertile soil. Another five acres is of the same type but these are in slopes, of a gradient ranging from 8-15%. There are 80 acres in gently sloping Shuri clays, shallow, moderately fertile, an olive colored, crumbly, calcareous clay; another 35 acres in the Awase clays, deep fertile, crumbly, calcareous clay of olive-gray color, and 14 acres of rough stony land.

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The hillsides and the summits are free of densely growing trees and shrubs, and the lowlands are given over to cultivation. There are no groves of trees to protect the crops from typhoons. The trees and the protection they give are confined to the village. This is typical of many villages of southern Okinawa, where the hills and mountains have few trees, and dense growths are associated with habitation.

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Inside the village, winding lanes branch off the main dirt road. The older houses are on the north side of the road. On the opposite side, the houses, newer or rebuilt since the war, adjoin the cultivated area. In the older section, the dense shrubbery, the tree lined lanes, broken occasionally by stone fences, wind through the village with footpaths branching off, sometimes past an open field, a reminder of a failure to rebuild after the war. On the northern outskirts is the village office, its gong in the yard, the open field, a playground for the children.

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(9) While the stones are being set and the uprights are being put on them, the women of the house and their female friends and relatives have brought in miscanthus grass and have begun making sheaves, tying each sheaf with a piece of grass. This goes on while the rafter poles are being nailed down. It is over this that the thatch is placed. The grass may be green or dry. In December it is in blossom, and when it is used, it gives the roof a snowy, fluffy appearance.

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(10) A series of short rods of dwarf bamboo or dried miscanthus stalks is then prepared to fit over the checkerboard made by the intersecting poles of the roof. The ends of these, which are about 7 feet long and 1/2 inch in diameter, are inserted into the braid of two lengths of rope about 5 feet long. These rods are placed at about 3 inch intervals. These frames are laid and down slope. They are lashed to the poles and to other bracing material beneath. All this is the work of men. While some of them are on the roof, others have begun nailing the siding. (See Fig. 6 for a sketch of the frames).

This is a very cheap lumber about 6 feet x 1 inch x 3/8 inch. The sides are boarded up like shingles except that the boards have uniform thickness. Each board overlaps the next lower one by 1/2 inch, a space of about 3 inches is left from the top of the upright poles to which the siding is nailed. The siding is sufficiently thin so that one side need not be thicker than the other.

(11) The triangular odd corners formed by the cross beams, the rafters and the center post are filled by fitted pieces instead of the rows of parallel rods used for the larger and more regular areas.

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(12) The roof is now ready for sewing the thatch on. First, the women throw several sheaves of miscanthus on the roof. They are tossed by hand or pitched by a rude pitchfork made by lashing a short branch to a long pole to form a Y. This is the kishi. (Fig. 7). One workman goes inside the dwelling. He has a pole about 6 feet long (a hari, the Japanese word for needle) pointed at the end with a hole near the point. (Fig. 8). Starting from the eaves and working up, the man on the roof unties the sheaves and spreads a layer of grass along the length of the roof. This layer is held in place by a horizontal pole placed over it. The man inside has threaded the needle with stout twine; he pushes the long needle with the twine up through the network of the roof. This is taken by the workman on the roof who feeds the needle with its twine back again. This sewing continues until the three layers, the checkerboard, the parallel rods which have been lashed to it, and the grass with the poles to hold it down have been finally sewed together. As each strip is completed the workman moves up the slope a little. The grass is about 3 1/2 feet long and about one foot is allowed loose on the end to overlap the layer below. That portion of the grass which is not free is tied and sewed very securely. There is much tugging, pulling, and grunting to make the knot as tight as possible.

000 (13) As the top is reached, another operation is necessary to cap

In this illustration, the first son receives slightly over 60% of the land, ignoring type and grade within type. There was general agreement in all villages that the grade of land within each classification (grades 1 to 4 in dry crop land, for example) had little significance in inheritance matters. The grade is more important for tax purposes. 428 [242] [651]

The example also illustrates two other principles: the natural desire to keep contiguous or close in land within the main family, using inconvenient or far off land where possible for house sites for branch families, or for arable land for second and other sons. In this illustration, the shares of the second and of the third sons could be equalized by subdividing plot #6, although its small area would not make it worth while, as 75 tsubo is a very low average size for dry crop land. [241]

Another practice, noted in Hanashiro and in Matsuda, is that the first son receives everything on the retirement of the father. This may be contrasted with a situation in which the father divides the property before younger sons marry and establish branch families. In such cases, the father might take the income from part of the property. But the more general practice is for the father to give all to the first son. Fathers may also make a will. When the first son receives all, it is the custom for him to hold property which the younger sons will need in establishing their branch families. It is in cases where the first son is given full disposition of the property that quarrels are most likely to occur, for much depends on the generosity and sense of fairness of the elder brother. [593]

In Hanashiro and Minatogawa, it is important that younger brothers receive genya land. Genya is often translated as wild land. In Japan the term is usually used to describe treeless, waste, hilly, rocky, or rolling land unsuitable for cultivation. In Okinawa, the genya land may be in the center of a rice field; it may be a rocky mound with cultivation around it. It may be land in the mountains. It is almost invariably in grass (miscanthus) with an occasional cycad or scrub pine. It is not owned in large tracts. In Hanashiro, the largest single parcel is 4564 tsubo (3.77 acres), in Minatogawa 1333 (tsubo) (1.9 acres), and in Matsuda 6398 tsubo (5.28 acres), but these are far above the average. In Hanashiro it is important because grass is constantly needed for thatched roofs and other uses. The importance of genya and its grass was well illustrated in Minatogawa after the typhoon, Ruth, of October 13-14, 1951. These villagers own little land and many have no genya. They were obliged to buy the grass to replace the roofs of many of the frailer houses which had been partially or completely destroyed by the typhoon. Genya is also used for family tombs. In Hanashiro, the genya 423 34 [137] [423] [824] [731] [432] [764]

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- 3 The problem can be appreciated by analyzing the acreage areas of each classification of land and the grades within it, bearing in mind that the average farmer has hatake, genya, and often rice paddies. These statistics will be given in the following chapter.

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In Hamashiro, The genya grass and shrub are essential as a substitute for firewood. In Matsuda with large areas of community owned forest, this genya is not so important to the individual family.

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In considering the inheritance of land, it is essential to understand that a family needs different types of land. Not everyone has rice paddies, but parcels of dry crop land and genya in the south are necessary to existence.

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If the practices of these three villages are indicative of the division of family holdings in general, the first son obtains between 50% and 60% of the land in addition to the house site. The remainder is divided, often equally, among the other sons. In the poorer families, if the sons are widely spaced, there may be enough left over for the second son, but when the third son reaches marriageable age, there may be nothing for him. Instances of this type were observed in the village. One young farmer of Minatogawa, a third son, said he received nothing, and set out by himself, first through wages, and then through small purchases to acquire his present modest land holdings.

This discussion may suggest a greater rigidity in the system of inheritance than is actually the case. It may give the impression of a series of families headed by the first son with most of the property and with younger sons and their branch families struggling along on what land can be spared for them. There has been, for historical reasons, more fluidity than this. The large number of heads of families who themselves are not first sons indicates that many second to fifth sons as well as daughters ultimately come into control of a family estate.

There have been four main reasons for this. (1) Emigration of first sons before they became of age. They left to earn a living in foreign countries to support their parents in the villages, became established and postponed to an indefinite future their return to Okinawa. Since the end of the war, according to relatives who are living in the village, many of these have no intention of ever returning except to visit. (2) Deaths of first sons without issue, and the succession of other sons or daughters. (3) Heavy war losses, especially of males. Some of these naturally were first sons, opening the way for the succession of young widows or second sons in the case of the unmarried first sons. (4) Deaths from catastrophes like typhoons, and in the case of Minatogawa, the losses of fishermen at sea.

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Inheritance practices with private ownership of land follow logically from the family system. They are a means of providing the economic base by saving the estate for future generations, at the same time providing where possible for sons not in the direct line of succession. Inheritance is a connecting link between the family system and land use and land tenure. Present land use and land tenure are an interesting example of the modifications that a system of social organization, the family system, has made on the natural environment.

single criterion is nearness, providing the land has possibilities. Good land, unless of substantial area, if remote and far from roads, is very time consuming and inconvenient. [311]

Genya land in the Oushichan area has two grades. The criterion here is the presence of grass and small shrubs that can be used for firewood. Grade two genya grows little or nothing either because of the large boulders or because it has too many small stones or consolidated rock with little vegetation. If it were not for stones or such topographical factors as steepness or ruggedness, some genya land could be classified as poor grade dry crop land. There are, as in rice land, tax differentials according to grade of hatake and genya land: [824] • [34] [33]

Grade	Dry Crop Land Tax in Yen	Wild Land (Genya) Tax in Yen
1	13	2
2	12	1.80
3	11	
4	10	
5	9	
6	8	
7	7	
8	6	
9	5	
10	4	

In Ginosa-son, the land classification system is substantially the same. There are six different grades of land classified according to yield in go per tsubo. (A go is 1/1000 of a koku, a tsubo about 4 square yards). [804]

Grade	Yield	Remarks
1	5	Two annual plantings.
2	4	Two annual plantings.
3	3	Dependent entirely on amount of estimated rainfall.
4	2	
5	1.5	
6	1.0	Mountain paddy, very uncertain, depending on rainfall; occasionally two crops a year are possible.

Dry crop land is judged by criteria similar to those in Oushichan-son. Grade 1 is good soil and convenient to water with good yields as shown by experience. Grades 2 and 3 are convenient to water, but soils are of lesser quality. The classification is also based on experience. Grade 4 is in low places, generally narrow ravines between steep wooded slopes. Grades 5 and 6 have little or no water, are stony, and inconvenient. [134] [312] [33]

Care and Conservation of Land

One of the significant tasks of our time is the study of the relation between population growth and density and the exploitation of renewable and non-renewable resources; the effects of a culture on the land, the forests, the soils and the vegetation must be considered in ethnographic and geographic work. If this is not done the culture is studied as if it rested, like a plate on a table, on a geographic base, without bothering to discover the nature of the environment or what the culture is doing to it.

Nineteenth century studies of primitive and advanced societies emphasized the influence of the physical environment in molding a culture. This crude fallacy, often known as geographic determinism or environmentalism, was exploded by studies made of cultures in all parts of the world in which it became clear that the physical environment is not the cause of cultural differences.

But the reverse of this approach, the examination of what a culture is doing to its physical environment, its soils, its vegetation, and its forests has not been carried on with the vigor with which other aspects of culture have been studied. This point of view has practical significance in day to day administration. Economic matters such as foreign trade or the labor force requirement should not be a separate and independent segment for study. Changes in inheritance should not be viewed solely with reference to the family system. Forest conservation should not be regarded only as a technique and a necessary department in the government.

The effects of the devastating typhoons, for example, need no elaboration; the destruction of life, crops, houses, of boats, and breakwaters. But their effects are also influenced by other factors. The two southern villages were in the midst of some of the violent fighting of the Okinawan campaign. Large numbers of houses in both communities were destroyed by the war. The new buildings to replace them are so frail that in typhoon times they are often destroyed. This rebuilding requires more wood and more grass. Thus, such factors as the war, the inability to reconstruct permanent housing, typhoons, and the natural growing of miscanthus grass are joined together in a close relationship.

In the south the relationship of typhoon destruction to deforestation is striking. There is need for tidebreak groves and shelter belts along the coast to protect crops from wind and salt-water spray, a need which fortunately the Ryukyuan Forest Agency is attempting to meet. Deforestation in the south seems inescapably tied up with long occupation. The center of population has always been in the southern part of the island. Not only should there be trees, but they should be planted in the right places. The deforestation of

Not all of the upland or slope cultivation is done by terracing, as we have seen. Crops other than rice are often grown on hillsides, or up slopes, less often following the contour of the land. The precautions here are also suited to the cultivation: weeds or grasses grow along boundary lines or divide off sharp drops, or small stone fences may be used. 241

In Nagamo, where there is no rice grown, there is little water from these sources. It comes from rainfall and amounts of sugar cane and sweet potato that are grown depend on its quantity and regularity. Water regardless of crop is a constant problem. [312]

In Okinawan agriculture, constant fertilization is necessary. There are too many people to leave land fallow in ordinary times. Each plot must be used if the farmer has the time and energy to do so. Since the island is in a humid subtropical climate, the organic materials in the soil (humus) are quickly oxidized. Porous soils encourage the leaching of minerals from the top soil, especially with torrential rains. The fewness of domestic animals increases the dependence on plant residues and artificial fertilizers. One of the commonest complaints of the Okinawan farmer, in addition to the poorness of his soil and crop damage from typhoons, is that it must be unceasingly fertilized. It is a treadmill. He must walk fast to stay in the same place. [34] [231]

There is very little difference in the use of fertilizers in the communities studied. Fertilizers most frequently used are:

(1) Composts. A typical mixture (though there are many combinations) may be composed of dried miscanthus, or any kind of grass, ashes and cinders, perhaps some pieces of charcoal, and goat droppings. This is left a month outside in a pile and put on the fields and hoed under.

(2) Plant residues. These are put on the soil, both of paddy and dry crop land, and hoed under. Plants are the greatest single source of fertilizer. The cut over rice plant is turned under in the paddy field. Tops of the sweet potato, if not used as slips or for food for animals, miscanthus grass, and burned rice hulls are other sources of fertilizer. [824]

(3) Animal manures mixed usually with pen grass. Animal fertilizers are not abundant, an indirect effect of the war which greatly reduced the number of horses, cattle, pigs, goats, and the smaller domestic animals. When available, goat, pig, or horse manures are used. Pig or goat pen grass is gathered up and spread on the fields. Pig manure is the best source of animal fertilizer, for pigs are the most numerous of the larger domestic animals. [727] [237] [231]

(4) Night soil. The use of night soil, called jinpun in Okinawan, has declined from pre-war times. It is often said that it is not used at all. But this statement must be qualified. It is [514]

The writers of a recent report on Okinawan economy have emphasized that the combination of generally poor soils, the rapid decomposition of organic matter in a near tropical climate, and excessive leaching make the problem of fertilization very difficult--to say nothing of the trace elements.

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(6) Other substances are used for fertilizers. In Matsuda the barber gathers the cuttings from the luxuriant hair of his clients and places them around his sugar cane--and recommends them highly. Acacia leaves are also used for this purpose here. Leaves and miscellaneous plants are often considered to be especially good fertilizers.

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Crop rotation (rinsaku) practices differ by district. In the Hanashiro area, the sugar cane, soy bean, and sweet potato (or vegetable), sugar cane rotation is common. Rotation of paddy with another crop does not occur. Rice succeeds rice in the double cropping system here. In Matsuda, a common rotation is either (1) the sweet potato, soy beans (or grain, millet, or green peas) and the sweet potato, or (2) the soy bean, sweet potato, grain (barley or millet) rotation. Here rice is not rotated with other crops. (This however does occur in Okinawa).

Simple Rotations Hanashiro and Nagamo

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One Year

After the sweet potato harvest, the plot is planted in soybeans in the first lunar month.

The soybeans are harvested in the fifth lunar month.

Sweet potatoes follow the soybeans in the sixth lunar month

or

Vegetables alternating with the sweet potato for a year.

Two Years

Sugar cane is sown in the sixth lunar month.

Harvested two years hence, followed by ordinary beans or vegetables, again followed by cane.

- 4 Agricultural and economic reconstruction in the Ryukyus. A report. Agricultural mission to the Ryukyus, Nov. 1949, 46-47.

One of these, the shimba (nnihija in Okinawan) is essentially a concave forked piece of metal set on a frame, which in turn rests on four props set up in sawbuck fashion. The rice sheaves are drawn through the teeth, causing the kernels to drop below. The sawbuck may be any desired height. Usually the top of the fork is waist level. The only significance of the shimba today is that it provides diversion and occupation for the old women, many of whom are too weak or too unsteady to operate the treadle thresher. The same is true of an even simpler device for threshing. Two short pieces of bamboo, or any piece of round wood, a little longer and with a slightly greater diameter than a pair of chopsticks, are loosely tied together on one end with straw or a strong blade of grass. The tied ends of the two sticks are held in the right hand, leaving the free ends to strip off the rice kernels from the straw. This labor is done by very old women. Age is no deterrent to work as long as people are able to get around. But, as in the south, the treadle thresher is universally used. This device was widely distributed by the Japanese agricultural specialists of the government throughout the empire in the years immediately before the war. In Matsuda, it is also thought to be about 15 years since its introduction. 243
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As in Japan, from which the terms were borrowed, rice in various stages of cultivation and processing is known by different names. Rice in the hull is momei; unpolished rice is genmai, and polished rice is hakumai. Rice stalks are known as wara. 824
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Hulling and polishing rice by machinery are also new in Okinawan villages. In Hanashiro, those machines driven by an open belt are about ten years old. A hand mill, the shiriushi, to be described shortly, was in general use for polishing rice up to 1940. 256

At present everyone, no matter how poor, pays for hulling and polishing of his rice. The mill owner in Hanashiro estimated that the machinery processed in ten minutes the amount of rice that formerly took a day to hull and polish by hand. Poor families do not try to effect savings by hand work. They pay the fee, sell the polished rice, and eat sweet potatoes. [511]
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Unpolished rice is disliked and is never eaten. It is described as hard and bitter in taste. The machinery in a rice mill varies from place to place in quality and modernity. The mill (seimaisho) has two machines: a hulling machine (momitsuriki) and a polishing machine (seimaiki). One simple type of a hulling machine is an endless chain type of mechanism. The rice is put in little buckets on the chain which carry it to rubber layers. As the rice is forced through the layers, the hulls are cracked and pinched off, and are then blown out on a pile in back. After being hulled, the rice goes through the shaft of the milling machine. The shaft housing is grooved. As the shaft revolves, it polishes the rice which is going through it. The shaft also gets heated, and this makes the polishing easier. In the older machine in Hanashiro, the rice was put through the shaft ten times

256 until the desired white shade was obtained. After the milling, the rice is quite warm, and both the chaff and the rice have an odor similar to brewer's yeast.

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[415] Women carry the rice to the mill. It is heaped up in baskets set on their heads. Rice straw or a braid of rice stalks is placed over the small towel which rests directly on the head. On this the woman sets the basket with its rice. When the milling is over, the women pick up a handful, blow off the chaff, inspect the rice for wholeness and whiteness, and then put it in a large gunny sack. The chaff is placed in a smaller one. Hulls, occasionally taken, are usually left at the mill to accumulate in a pile outside the mill and there, at frequent intervals, are burned. Sometimes the hulls or the ashes are taken for fertilizer.

• [82A] Bringing rice for milling is a social occasion for the women. They often have a child on their back. While waiting for their rice to be hulled and milled, they exchange greetings and news with their neighbors or with women from adjoining villages.

[727] As a result of the war, quality of machinery for rice milling differs with villages. Most now have access to a mill. The machinery at Matsuda, being more efficient than the older machines at Hanashiro is able to polish the rice satisfactorily after going through the mill three times. These mills are very busy during the harvest seasons.

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[412] There are also survivals of older methods of hulling and polishing rice. These are no longer used, though many of the old have not lost their skill. Before machine polishing was introduced, the hulls were removed by pounding the rice in a mortar, usually with a long bamboo pole narrowed in the center for a grip. After the hulls were removed, the rice was put through a quern, or a mill known as a shiriushi. This has two working parts: a base about a foot in diameter and perhaps a foot in height. It looks like a smoothed off log. In the center, there is a wooden pin, perhaps 1 1/2 feet long. Over this part, which looks like an upright piece of a log with a rolling pin stuck in its center, the upper part, made of wood and of the same diameter is fitted. A bar across the inside of the top of the upper part has a hole for the pin. On the outside, wooden plugs provide places for attaching ropes. These are pulled back and forth by women sitting opposite one another. The rice is poured in at the top, the quern is moved first clockwise and then counterclockwise, the rice coming out in the rough crevice where the two pieces join. The rice is put through the quern as many times as is necessary to effect the polishing. In some querns, the inside of the upper part is grooved to quicken the polishing.

[462] In polishing rice in this way, the mill is placed on a mat and the rice is gathered up periodically and put in baskets. It is then winnowed by tossing in a flat basket. Many of the farmers in the villages still have a shiriushi in their sheds, but it is seldom used.

Rice may also be polished by the use of rude wooden mallets. These have a handle about 3 feet long and a head about 1 1/2 feet long. Rice is placed in a mortar with straw on top. It is pounded, often by two or three women swinging alternately. After the hulls are removed, the rice is winnowed, and put back in the mortar until a rough polish is secured.

Uses of rice. Every part of the rice plant has a use. The stubble, left in the ground, becomes a part of next season's fertilizer. The chaff and waste dust (nuka) is saved for pigs, cows, and other domestic animals. The hulls often are used for fertilizer, before or after burning. Rice straw has a variety of uses. The most frequent and important of these is for making rope.

After threshing, the straw is dried two or three days. Three or four stalks of about the same length are taken and rolled between the palms. The lower palm, usually the left, is open and up. The right palm rolls the straw into a twist. As the rope grows, new stalks are inserted one at a time, and, when needed, a new length of straw is added. This is not a strong rope, but it has a variety of uses, such as tying down the grass thatch to the roof poles, children's swings, and clothes lines. Mats and pads shaped like a life saver and used to set the sugar pots on after the sugar has been boiled, are made out of rice straw. Another use is in the making of the Eda (Okinawan). This is a mesh about one foot wide and two feet long. There are loops on each corner. The end of a pole may be inserted in these loops when gathered together. The pole is carried over the shoulder, and sweet potatoes, straw, or other articles may be easily transported. Simple brooms without a handle, little more than a bunch of straw tied together in three places are also made of rice straw. Twisting and braiding rice straw is likely to be rainy day work. These articles are most often made twice in the year, corresponding with the harvests.

At typhoon times, if rice is not completely destroyed, the damaged rice may be used for pig food. The preparation of this rice is women's work. The rice is put in a mortar and pounded with a mallet in the manner already described, although a single operator usually does the work.

Types and preferences. As a general rule, the selection of varieties of rice for planting depends on taste, the nature of the soils, and individual judgment of the expected yield of each type. In Matsuda, it is estimated that about one half of the rice is the Formosan variety, Taichu 65 (Taichu rokujugo), in Okinawa known as horai. Another variety, Kunigami #1 (Kunigami ichigo) represents about one-fourth of the crop. Mochigome (akaho) takes up about another one-fourth. This glutinous rice has a brown reddish rust colored kernel and is used for rice cakes. A fourth variety, horai-mochimai, is also well liked. No black rice is grown here.

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months. The amount of sweet potatoes grown is not closely related to the season. It depends much more on rainfall.

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The effects of typhoons on the plant are most noticeable after transplanting. Salt water spray shrivels the transplants up and they die without developing. These conditions are more noticeable near the seashore in areas like Nagamo that lack trees and tidewater shelters.

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Like rice, all of the sweet potato plant is used. Plant residues are turned under to fertilise the soil. This turning under of the vines or their use in composts is a doubtful blessing if the plants are diseased. The good potatoes are reserved for human consumption. The poor or the diseased ones are mashed up in a stone mortar with a long pole, used like a pestle, for pig and goat food. Besides using the tops as slips, women constantly cut them off for fresh greens for the pigs. The sweet potato is the basic food because it is cheap, can be grown the year round in lowlands and uplands, and can be cultivated by all members of the family. As pig food, it is a means of inexpensively raising animals which later have cash value. The feeding and care of pigs is usually one of the incidental chores of women.

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The varieties most commonly found in these Okinawan villages are the Okinawan #100 (Okinawan no hyakugo) and varieties known locally as the Bentō, a small round tuber, and the bokuto. The two chief differences between the northern and southern villages in cultivating the sweet potato are (1) the two and three pronged hoes are much more in evidence in the north. With practice, they can be used advantageously in quickly weeding a plot while not cutting the potato itself. (2) Matsuda appears to be less dependent on the sweet potato as a human food. The farmer here has more rice for himself and a greater proportion of his sweet potato crop goes for animal food.

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6

The Planting of Sugar Cane and Sugar Making

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Sugar cane (kibi) is grown on dry crop land, its rows often alternating on the same plot with the sweet potato. Cane may be started with cuttings, or it may be a second growth (ratoon) from the stubs of the old plant after it has been cut down for crushing. Cuttings may be purchased or selected plants from another planting are used. The slips are cut to leave three buds. These cuttings may be planted in three ways: (1) all horizontally, (2) horizontally with the cutting which comes from the topmost part of the stalk planted slantwise, or (3) all cuttings may be planted slanting.

The soil must be thoroughly worked with the ever present hoe. Plowing and harrowing are rarely done. The earth must be thoroughly fertilized. In addition, small amounts of compost may be placed under the cutting, and less often liquid night soil might be used.

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Soy beans have three main uses: soy sauce which is seldom made in the home, bean curd (tōfu) and miso, a bean paste, both always home made. For this reason, soy beans are grown mostly for home use, with the surplus sold. In Hanashiro, where the surpluses are greater, the beans may be sold in Naha, Shuri, or Itoman. Women do the selling, taking the beans to market on the buses, trucks, or three wheeled vehicles.

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(2) Other types of beans such as the red dwarf bean (asuki) (Phaseolus angularis Wight), the kidney bean (ingen in Japanese, Phaseolus vulgaris L.), the broad or horse bean (soramame in Japanese, Vicia faba L.), and peas (endo in Japanese, Pisum sativum L.) are grown for home use, usually in parcels which are closest to the house.

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(3) The giant radish, (daikon in Japanese, Raphanus sativus L.) is, after the soy bean, the most important of the minor crops grown for home use. This is the vegetable most favored either as a condiment, or as a side dish. It is eaten sliced raw, pickled, or fried in strips in soy sauce. When eaten boiled, its flavor resembles that of a turnip.

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(5) The pumpkin (Cucurbita pepo L.) called nanka or kabocha, the latter name being derived from the word Cambodia from which the pumpkin was introduced into Japan. They are harvested in summer, and one crop a year, generally for home use, is grown. If the flesh becomes too ripe and turns reddish and sweet, it is not relished and the pumpkin is fed to the pigs.

(6) The cucumber (kiuri in Japanese, Cucumis sativus L.) is a very minor crop. In none of the villages were they generally grown, and then only for home use.

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(7) The hechima or tōgwa in Japanese, subui in Okinawan.⁷ This is very large and cylindrical. In exceptional specimens, its outward appearance is indistinguishable from the water melon. Its flesh is white. In the two southern villages, the tōgwa is grown very sparingly. In Katsuda and the surrounding villages, it is more common. Here it is used to fill in during times of food shortage. Some specimens I have seen weighed over 100 pounds. It is planted after lunar New Year, harvested in the 6th or 7th lunar month, a period reaching from about January to May. From April to July, when other vegetables are scarce, it is often used as a substitute. The flesh when boiled is rather tasteless; it is commonly boiled and served with chunks of meat. The tōgwa, in the northern villages, is often stored in dark cool places away from the sunlight, often under the house. If not cut open, the melon can be saved for a year.

7 I am not certain whether this is Luffa cylindrica Roem, Luffa petola, Ser, the Luffa sponge, rag gourd, etc., whose pulp disappears when ripe to be replaced by a web of fibres.

24) a/ A chū is 3000 tsubo, or about 2.45 acres.

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[809] Source: Agricultural Section, Gushichan Village Office, Gushichan-son, Okinawa, September 1951.

In Ginoza-son, statistics for crops on an individual village basis were only obtainable in part. Some Matsuda figures which were available indicate that rice, the sweet potato, and sugar cane were the most important of the crops:

Rice lands	82,151 <u>tsubo</u> (about 27.4 <u>chū</u>)
Summer plantings	58,000
Fall plantings	54,000
	112,000 <u>tsubo</u> , including double cropping.

Dry Crop Land	188,305 <u>tsubo</u> (about 62.8 <u>chū</u>)
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Sugar Cane:	
Summer planting	2170 <u>tsubo</u>
Spring planting	6840 " "
	9010 <u>tsubo</u>

The greater part of the remaining dry crop land is believed to be in sweet potatoes.

8

Native Uncultivated Plants of Use to Man (Other than Forest Trees)

- 824 In the south, trees such as the banyan (gajimaru), the Japanese redwood (sugi), and the usuki are important within the village as windbreaks. The importance of miscanthus sinensis, often called kaya or susuki, has already been mentioned. Certain plants, used for medicinal purposes, are becoming scarce and are being displaced by modern drugs, but have some interest. Other plants, formerly used in home industries for weaving and making straw sandals, have also declined in importance in the villages.

In the south one of the most interesting associations is that of the Ryukyuan pine (Pinus ryukyuensis), the cycad (sotetsu in Japanese, Cycas revoluta, Thunb.) and Chinese silver grass (miscanthus sinensis). The Ryukyu pine in this area is little more than a shrub. It has some uses for firewood and for minor construction, but the lumber for substantial houses comes from the northern forests.

[262] The cycad, now rather uncommon in this area, has had several uses. The whole plant may be a windbreak or be used for firewood. A form of starch (rennan in Japanese, kuzu in Okinawan) is made from this plant, a food traditionally used in time of great hardship or crop failure.

The starch comes from two sources; the large oval seed, ranging from orange to Chinese red when mature, and the stalk. Use of the stalk involves destruction of the plant. According to Gushichan area residents, the starch of the cycad seed was used for food in 1945, 1946, and parts of 1947. Timing is an important part of the starch making because at certain stages of development the cycad is poisonous. Today in areas where the cycad is plentiful, the seeds are still gathered and dried in large quantities. Toward the end of November in Oku and in the nearby mountain village of Hedo, and in other villages of the far north of the island, large quantities of cycad seeds can be seen drying in the compounds. In the Hanashiro and Minatogawa area, the cycad is not plentiful enough and is too scattered for these uses. 824 262

The main uses of miscanthus are: (1) roof thatch, including the saddle back which caps the roof, (2) firewood, (3) the younger shoots for animal food, (4) fertiliser, (5) a raw material for home weaving of baskets and slings for carrying vegetables. 824

Miscanthus can be seen to best advantage in December when it is in full bloom and covers large areas of the uncultivated countryside. Considering the present economic situation in the south, these plentiful grasses are indispensable to daily living. One must see, from day to day and with his own eyes, the dependence on these wild grasses to appreciate the force of this statement.

In the southern area studied, one consequence of the war on the natural vegetation was the spread of the grasses at the expense of the pine and the cycad. Residents of the Hanashiro, Gushichan, and Minatogawa areas have said that prior to the war, the Ryukyuan pine was plentiful and covered hill and mountain sides now quite bare, save for an occasional scrub tree. These trees were destroyed by bombing and firing. There are occasional evidences of regrowth due to natural seeding, but the clumps are small, and nothing like a stand is growing. The stands even before the war, however, must have been inconsequential compared with descriptions of the area fifty years ago given by old residents of the area. The present deforestation of large parts of southern Okinawa seems to have accelerated in the recent past. 137 727

The cycad had a similar fate in the south. The plants are numerous in the sense that one can always be observed on a walk. They grow in clumps, often alongside the pandanus. The grasses seem to have displaced the cycad and the pandanus as well. The dense settlement, cultivation, use of trees for firewood, and the recent war account for the uncultivated hillsides in which the grasses now predominate, and on some of which not a single tree or shrub is to be observed. The original native vegetation, perhaps, may still be preserved in the limestone sinks which occur here and there in this area. 137 [311]

In Hanashiro, the absence of trees and shrubs except in the settled areas has already been noticed. This is a characteristic of villages in the south. The treelessness of Minatogawa is exceptional.

- 824 The most common of the Hanashiro trees are (1) the banyan or gajinaru, or yōsu. This tree is a common sight with its long roots growing around and through the stone fences. The tree with its roots bracing the stone fences is excellent typhoon protection for the village. (2) The usuku (Japanese scientific name, the akou) resembles the gajinaru in appearance and serves the same purpose. The fukugi (Darcinia spicata Hook) and an occasional cycad are common windbreaks. These trees are almost invariably in combination with stone fences, made of blocks, or with fences made of loose stones which have settled and been bound together by small plant roots. Village typhoon protection is a simple but effective combination of stone, shrubs, and trees. There is also an occasional kuroki (kurchi in Okinawan), from whose trunk the sanisen, the stringed musical instrument, is made, and the palm (shuro).
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There are wild plants in each of the areas but their importance has also declined. Among these is the pandanus (the adan, Japanese scientific name, the takonoki). This plant was plentiful before the war, but is now scarce except in the mountain area. It can occasionally be seen in genya land or in small clumps on an outcrop. The blades of the pandanus are long and hard, with a row of spines down both sides of the blade. It has had several uses. Formerly it was the common material for making slippers (sori), hats, cigarette cases, and handbags. These home industries have all but disappeared, but old people occasionally do a little. In preparing the pandanus blades for use, the thorns are removed and several strips are made. These are then boiled, dried, and smoothed out. Then they are woven into the desired pattern. A first class pandanus blade is about 5 feet long. In the celebration of O-Bon, the fruit of the pandanus may be offered as food to the ancestors.

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Another plant occasionally used is the getto, known also in Okinawa as sannin or muchigasa. Its chief use is in the festival of the 8th day of the 12th lunar month. At this time, rice cakes (mochi) are wrapped up in its long and wide and flexible fibres. These wrappings, often made by children, are hung from the ceiling or from the wall. The stem of this plant was much used in the past for rope.

The nigana (njana in Okinawan, Ixeris dentata Nakai) is still used in this area as a food and medicine. It has an exceedingly bitter root, about 1/8 of an inch in diameter in a mature plant. The root is put in hot water, and the liquid drunk as a stomach medicine. The leaves, not so bitter as the root, have a sour, slightly bitter taste. They are often served with the white cuttlefish (shiroi-ikka).

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The Obako (known in Okinawan as the hirawakusa or hirawagusa, Plantago Asiatica L, "Japanese ribwort") is used as a medicine and as a food. When vegetables are scarce, it is eaten as a green. As a medicine, the leaf is heated over a fire and the hot leaf is then pressed over a swelling.

Moxa (mogusa in Japanese, fuchi'ba in Okinawan) in the traditional Chinese and Japanese pharmacopoeia, had considerable former importance. In powdered form, it is placed on a swelling or painful part, which is cauterized by burning the moxa with a charcoal stick or a hot piece of metal. Moxa can be bought, packed and prepared in Japan, at most Okinawan village stores. But wild moxa is not used for this purpose. Formerly a brew was made of the wild plant and drunk for bringing down a fever. It is still used with the yagi, another plant, as a broth. Now aspirin, also obtainable at village shops is commonly taken for these ills.

These plants are now nearly forgotten. In Hanashiro only the nigana and mogusa were remembered. In Minatogawa, the situation was the same. In Nagamo, a few slippers from the pandanus are still made. The virtual disappearance of home industries based on the pandanus is the result of a diminished supply and in part to loss of skills and failure of a younger generation to acquire them either because of the attraction of more exciting occupations or to lack of interest. This is not meant as a generalization. Home industries based on the use of uncultivated plants, has not vanished from all parts of Okinawa. Activity changes from locality to locality, even when these are close together. Slipper production from the pandanus has practically disappeared in Minatogawa, but across the river in the village of Horikawa they are still made.

<u>Plant</u>	<u>Hanashiro</u>	<u>Minatogawa-</u> <u>Nagamo</u>	<u>Matsuda</u>
Pandanus (<u>adan</u>)	Scarce, not used	Some slippers made	Not used
Nigana	Root boiled and used as a medicine		Broth for stomach and headaches.
Ukako	Not used	For swellings; hot leaf used as a poultice.	Not used
Moxa (<u>mogusa</u>)	Used as in Minatogawa	Wild plant boiled, brew used for bringing down fever. Powdered form purchased.	Used in combination with another plant, the <u>yagi</u> , resulting broth used for general complaints.

cash income. Pigs are seldom eaten by the family that raises them. On New Year's, a family will slaughter a pig or three or four families might co-operate in sharing one. Pork may also be served at O-Bon and at Jūgoya, the autumn equinoctial holiday season. 231 [262] [527]

A family often gets its start in pig raising by obtaining a loan from a mutual loan group. (These groups will be discussed later). A young pig may cost about ¥2000. Male pigs intended for market (nikubuta in Japanese, shishiwa in Okinawan) are castrated two months after birth. Keeping breeding pigs (tanebuta) is a special business. Men engaged in this business bring the boar to the pig raiser's home. Each village has such a businessman or at least has convenient access to one in a neighboring village. The fee usually charged is ¥200. If the first attempt at breeding is unsuccessful, a second opportunity is given free. On the third try, the dealer claims his fee again. In Matsuda, there is a belief among the old that as the tide is coming in, if a sow is in heat, the male will be able to perform, but that in the ebb tide he cannot. [426] [435] [232]

Great care is taken in housing pigs adequately, if the family is able to do so. The pig sties made of stone or coral may be better than the houses of their owners. This is by no means so shortsighted or ridiculous as it might seem. Pigs are the means, one of the very few means, by which an agricultural family may acquire substantial sums of cash. To protect this living bank account, considerable sums are invested in fine stone, or cement floors and an adequate roof. The pen must be strong to withstand typhoons. With a good pig pen, a sow, and a good litter, a family can look forward to improving its financial condition and its own housing. There is great variety in the quality of pig pens. The pen may be in combination with the outside toilet, but with the two places completely separate; it may be part of a larger shed which also houses the goats, the cattle, or the horse. If a family can afford it, the pig is housed in a stone pen with stone floors, or with other sturdy materials. 231 343 [434] [517]

The day to day care of pigs is mostly the work of women. While the husband is at work in the fields, the wife, as an incidental part of her duties, goes to the nearest plot to cut sweet potato tops, or mashes sweet potatoes in the stone mortar in the compound, often with her infant child on her back. There are three favorite varieties of food for pigs: (1) the leaves of the sweet potato plant not suitable for human consumption or not needed for transplanting, (2) the potato itself. The poorer grades of potato are put in a stone mortar and are smashed with a long pole, or pestle. (3) A cloudy liquid consisting of the sweet potato, waste bean curd (tōfu no kasshu) and water. This is always given warm. The pig may also get poor rice, or rice spoiled for human consumption by submersion as a result of a typhoon, or miscellaneous left overs from the table. 231 824 [462]

There are no ceremonies in any of the villages associated with slaughtering the pig. Villagers seldom kill their own except on 231

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[417] settled area and for protection of the surrounding crops. Around houses, there are common stone fences, bamboo fences and trees. Stone fences, though solid may be toppled over. Bamboo, or dwarf bamboo fences, seemingly slight, resist the winds and remain intact because of their flexible loose weave.

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[493] The trees on the ridges of the low lying hills or on high pieces of ground are tall, and sturdy, and jealously protected. The villagers take great pride in them. Today this pride is based on the realization of their effectiveness; in former times, their protection was associated with the worship of the gods of the sacred grove (utaki). There were beliefs, which now seem to be dying out, that cutting these trees would bring bad luck. Many villagers say that Saion in the 18th century intentionally invented superstitions concerned with the cutting of the trees in order to save them. Now these trees are no longer in danger of cutting, even though the penalties of the old beliefs are no longer feared.

The following short list does not exhaust the kinds of trees and plants found in this area. It is confined to those trees, shrubs, and grasses which are most frequently found and which have the greatest local importance.

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313 (1) The Ryukyuan pine (Riukiu-matsu in Japanese, Pinus luchuensis Hayr). This tree is still one of the commonest sights of the island, even in southern Okinawa. At present, it is a source of firewood, cheap lumber, and siding. It is not considered good housebuilding material because of termites (shiroari). Pine was used for fishing boats within living memory, but now they are made of much harder woods. In this area, the coniferous groves are along the seashore. The larger stands are not cut. Scrub pine on individually owned wild land may be cut for firewood.

(2) The fukugi (Darcinia spicata Hook.). The fukugi is used around homes and on mountain ridges as a typhoon protection. It is fairly plentiful here and prized as a building material (kenchikuzai). The hard studs, beams and cross beams and the wide plank floors in the older and better houses are often made out of this wood.

(3) The iju (Schima luchuensis Nak.). This tree, common here, is used as a building material and is considered to be better than the Japanese redwood (sugi). It is not regarded as a good firewood.

(4) The inumulci (Podocarpus macrophyllum D. Don). This tree is not well known here, and there are no large specimens. But it is regarded as the best building material when available. Often the large, hard, rough hewn poles which are placed on stones and support the eaves of the older houses are made from this wood.

(5) The shii (Shiia cuspidata). The dense stands of this tree in the village owned forest restrict the size of the specimens, though

in isolated spots the tree grows to a considerable height. This is a favored wood for housebuilding materials. It is also used for firewood.

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(6) The nokumao (Australian pine, Casuarina equisetifolia L.). This is a fast growing tree and quite plentiful in this area. The nokumao is commonly a shelter belt tree here. Along with the pine, and the shii, it is used for firewood.

(7) The shuro (Prachycarpus excelsus Wendl. Var.). Individual specimens of this palm are scattered through the village. It is found in local ravines, sinks, and near the natural bridge. When it was more plentiful, rope was made from its fibres. Before the war, it was the standard material of the farmer's raincoat. Rope making continues on a very restricted scale.

(8) The soshiju (Acacia confusa Merr.). Individual acacia trees are numerous but scattered. Frequently the tree grows on the house site as a typhoon protection. It is also used for firewood. Branches of the soshiju are often placed over or around young vegetables and other plants to shield them. Its leaves are placed on the dry crop lands and on paddy fields as a fertilizer.

(9) The gajimaru (Ficus retusa). This banyan tree was noticed by earlier travellers. It is a picturesque tree. The exposed roots twine around lesser shrubs, stumps, and stones. Specimens are scattered, and its chief use, here and in the southern villages, is for typhoon protection. Smaller trees, their roots growing in an around the stone fences, are a common sight. The leaves may be used for fertilizing the soil of rice fields.

(10) The cycad (soetsu in Japanese, Cycas revoluta). This plant has already been discussed. While more frequent here than in the south, it is not plentiful. One must go farther north before the cycad becomes important in the daily economy. In Matsuda, the fronds are used to protect young growing plants, the leaves as a fertilizer for plants other than rice. Occasionally starch and a bread are made from the seed. Fermented drinks were once made from the cycad. There is no present market, as there was in the past, of fronds used in funeral wreathes.

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(11) Suzuki (miscanthus sinensis, Chinese silver grass), commonly referred to as kaya, upon which we have already commented so frequently. This grass is not so important here as in the southern villages because of the availability of superior wood and fibres from the forest. It is not used as a major fuel, nor to any great extent for roofs, since the dwarf bamboo is available. The grasses collectively known as suzuki are used as a fertilizer. The young shoots are often given to horses, cattle, and goats. One does not observe here the dominance of this plant, such a conspicuous part of the landscape of the south.

824 (12) The pandanus (adan or takonoki, Japanese scientific name, Pandanus oeraticissimus L.) is also scattered. Formerly the pandanus was widely used in Okinawa for slippers and a Panama type hat was made for export. This home industry has disappeared from Matsuda, as it has from the south.

(13) The i (Juncus effusus, Linn. var. decipiens Buch). This rush is used in the better quality home made mats (mushiro). The i is generally the warp of these mats, with some other grass the weft. It is occasionally cultivated when rice paddies are not in use, as it requires much water. There are two varieties of i, the round, and the three cornered (sankaku). The three cornered variety is used in cheaper quality mats. The round variety with cotton string as the warp, is used in weaving the best mats.

(14) The Yambaru bamboo (Yambaru take). This I believe is the same as, or at least very similar to the Japanese sasa, or dwarf bamboo (Arundinaria communis Mak.). Yambaru take means "northern district bamboo" and throughout Okinawa the term is used to describe this valuable plant. In appearance, it resembles the susuki grass, but its stalks are much woodier, have a greater diameter, and the plant is much taller. In an uncleared forest, the Yambaru bamboo grows six to nine feet high and has a foothold wherever there is the slightest room in the forest. Patches often are intermingled with the shii, pine, and the numerous shrubs. This is the roof thatch material of the north. Its other uses include the weaving of stationary barriers (hinpun) in front of the house compound. The stalks are closely woven diagonally while still green. The plant has innumerable uses, depending on individual improvisation. While green, charcoal containers may be made out of it; it may be woven into rough baskets (zaru) for carrying sweet potatoes, or to bind up the small bundles of firewood which are sent south. In general, the smaller diameters of Yambaru bamboo are used for roofs; the larger for bamboo fences (takegaki) and the face level hinpun. Bundles of Yambaru bamboo are sent to Naha and Shuri for weaving.

3

The Uses of the Forest

313 Clearcutting seems to be the curse of traditional Oriental forestry. Starting at the convenient base of a hill or mountain, every tree has been cut up the hill until a steep or inaccessible part is reached. This destructive exploitation has been an established Japanese forestry practice despite the obvious inducements to soil erosion.⁵

The results of clearcutting observable near Matsuda now are a product of the overwhelming war and post-war demand for lumber and

5 A report on Japanese natural resources, as cited, 357.

Few articles for wear or general household use are made in the home. In Hanashiro and Matsuda, different kinds of ropes are made from the palm or from rice straw. The fibre of the palm is pulled apart and carded with the hands. Lengths of the fibre are twisted by rolling between the palms of the hand. These ropes are very strong, but the palm fibre is now scarce.

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Weaker articles made of rice straw are far more common. The chief ones are ropes (waratsuna), mats (mushiro), a rope mesh (ōda in Okinawan) carried on the ends of poles, twine, and swings (buranko) for children. Braided rice twine is used to tie the dwarf bamboo down to the roof before putting on the tile on top. In Minatogawa, very few articles of home manufacture are made. Some mats, a very few slippers, and fishing lures are the chief articles.

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The people of Matsuda have better plant fibres and more mat making is found here. Two families specialize in making mats, one using a foot operated loom from Japan, the other a very simple hand loom. Mats are made from two plants which are indigenous: the i rush and the pandanus. Two kinds are used, a three corned (sankaku) and the round (maru), the latter considered superior. In Matsuda, there are four types of mats distinguished by the materials employed: (1) the pandanus mat, (2) the pandanus as the warp, the i rush as the weft, (3) cotton string as the warp, the i as the weft, and (4) an all i rush mat. The best quality is the all rush mat. It is a strong, closely woven and attractive mat. Weaving is done by men in their spare time, or as a full time occupation by those physically unable to do hard work. Occasionally women weave, but it is uncommon. The market is mainly local.

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In the simple upright hand loom, the warp beam is attached to the top board of the loom. The warp is stretched taut and fastened to the bottom board of the loom (corresponding with the cloth beam). The cotton strings, which make up the warp, are alternately set forward and backward, and when the weft is pushed in it goes over one string and under another to make the weave. The weft once in place is pushed down to the bottom by a movable board, with holes which guide it up and down the warp, to make the weave. In lieu of a shuttle, the rush strips used as a weft are guided through the cotton strings of the warp with a piece of bamboo about 4 feet long notched in the end like a bottle cap opener. One end of the rush is put in the notch and the stick is pushed alternately through the threads of the warp. The ends of the weft are tied to the warp to make a fringe and secure the mat against ripping. The rush is wet with a brush before using. It takes about 12 hours to make a 3 x 6 feet mat on this type of loom.

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Men in Matsuda also make rough baskets, mainly for carrying vegetables and the stationary barriers (hinpan), made of the dwarf bamboo. These are woven diagonally when the plant is green and moist.

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In the villages there is little effort to beautify the courtyard, train trees, or to cultivate shrubs and flowers. Now and then one sees a flower bed in the compound or the remains of a rock garden with shrubs and a small pond. But there is little to suggest the Japanese skill in these matters.

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who upset the tea cups and the sake flasks.

A public parade and celebration was held in Itoman in 1951, and a short digression to describe it may be worth while. The main attraction was a parade, which halted frequently so that participating groups could perform dances, acts, or skits. In these there were several themes: (1) dances by female groups of all ages from beginning school girls to old women in their seventies. Many women wore artificial turtles on their hats, the younger children having paper outlines of turtles. The young girls were led by an older man who kept time either by playing the samisen or by clapping his hands. The very young girls beat small tin cans with sticks. The dances of the older girls and women were of two kinds: one symbolized the crane and the turtle (tsurukame). The turtle is a symbol of longevity. The second is the pine-bamboo-plum tree triad (shochikubai) symbolizing long life and beauty. (2) Female impersonators imitated both the traditional Japanese woman with her costume and hair arrangement, and the modern woman with a chignon wearing a bright kimono, sun glasses, and smoking a cigarette. Their antics depended for their humor on the gracelessness of the men: they included mock flirtations and rejections, kicking of the heels, slapping with a fan, and other clowning. (3) Various balancing acts with long poles done by boys and young men. (4) Skits of individuals dressed as savages from the south seas. (5) Humorous acts showing the people of the northern district who were portrayed as jolly country bumpkins. Their caps, with tassels, looked like a coconut shell. The long false hair and beards were made of palm fibre. They carried ludicrous looking saws and axes while dragging a log.

One feature of the Itoman celebration was the well-known rope pulling contest (tsunahiki). The giant rope, made of rice straw, is at least 100 yards long, and about two feet in diameter. Each end has a loop. These loops, joined by a heavy piece of wood, are above the center line. The men of the town divide into two groups. The tug of war began about 5 in the afternoon and was soon over, but one has been known to last until one or two o'clock in the morning. It is found in all villages, but there is no set date for it. The tug of war is an old diversion in Okinawa.⁵

In former years, Minatogawa people participated in the Itoman festival. In 1951, they held their own evening celebration. This is a time of great beauty, with the light of the full moon illuminating the Pacific, the coral coast, and the mountains. The evening entertainment consists of some acts, similar to vaudeville, and a longer play. Crowds came from the surrounding villages, bringing their own sake and their own sake. Most of the officials of the township attended.

⁵ Goldschmidt, Neu-Japan, has reproduced an interesting painting showing a tug of war in Naha around the end of the 18th century. It shows an audience of court officials, the Chinese ambassador, as well as the various participants. Facing p. 179.

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[536] Young girls with pots of hot tea circulated in the audience. The stage performance was a combination of local amateur talent and professionals from Naha. Normally the entertainment begins with a traditional Okinawan dance by a professional woman dancer, followed by a short skit. Conversations in Okinawan between an educated man and a stupid rustic are favorite subjects. Acts of this type are greatly enjoyed and cause laughter, mainly I was told because the jokes had sexual overtones. The shorter acts are followed by a play. (The theme of this play will be discussed in the following chapter).

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Other Holidays of the Year

[824] Chrysanthemum day, the ninth day of the ninth month (October 9, 1951), is a very minor holiday. A chrysanthemum is put in sake, and the flask is placed on the god shelf. A leaf of the plant is put in the sake when it is drunk. People at this time wish one another good health. The festival is only spottily observed.

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[252] There is a minor public holiday, the rice cake festival (nochi no matsuri), said to be native to Okinawa, on the 8th day of the 12th lunar month (January 4, 1952). On the day before, women prepare red and white cylindrical rice cakes, about 4 inches long and one inch in diameter. These are wrapped in the leaf of the sannin plant or in the leaves of sugar cane. The glutinous rice cake is made by first soaking rice in water and then mashing it in a hand mill. The rice is put in a cloth bag to allow excess water to drip out. The following morning the rice is boiled and shaped and wrapped in the leaves. The cake is doughy and insipid to taste. On the morning of the 8th, the cakes are placed on the god shelf and after prayers the cakes are removed. They are served during the day to guests. Sometimes children attach strings to these cakes and hang them about the room. The holiday is not observed by every family in the village, but it was recognized in all the villages studied.

[769] The festival of the winter solstice, the longest night of the year (tsuji) is known, but Minatogawa was the only place in which its observance was noted. It is a home festival with prayers and the familiar offering of assorted foods to the ancestors.

[777] Western Christmas is not observed in any of the villages. It would not be surprising if it should become a holiday, with gift giving, feasting, and drinking, but without the religious connotations. Since the occupation, Okinawans have become conscious of Christmas.⁶

[797] 6 I was told that in certain villages of the northern district, such as Kushi and Higashi near Ogimi that there is a Christmas festival, without the gift exchange, a survival of earlier missionary teaching. Time did not permit me to verify this, but there seems little doubt that a Christmas festival does exist in some Okinawan villages, judging by the frequency with which I heard of it in Matsuda and Ginoza villages.

trees of the sacred grove and used old beliefs to preserve the forests. Formerly it was believed that misfortune would come to him who cut a tree in groves sacred to these gods. If the trees were cut, the god would become angry, the person cutting the tree would be the victim of self-induced illness and by worrying about his deed, gradually would become ill, and perhaps die. These sacred groves, whose religious significance is now almost ignored, are arranged to enclose the village from three directions, with the open side on the south. On the north was the sacred grove in the back (ushiro no utaki) or the grove of the white gold mountain (kinpuku utaki in Okinawan). The mountain gods were supposed to live here. On the west was the grove in front (mae no utaki) on the white silver mountain. This was also known as the fire shrine.

The priestesses also had a hand in this worship of the mountain gods. There are about seven of these places of worship now, and there is still a voluntary caretaker, an old woman with tattooed hands, a family priestess (nigami) in the old system. Occasionally one sees an old woman going to a grove to pray. The only other visitors are the farmers who walk along the paths of the grove on their way to the fields.

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Other Religious Observances

There are a few other observations which may have some interest. Old women use patches of grass or knotted rice straw to ward off the spirits on days when they are thought to be abroad in great numbers. At the festival of the autumnal equinox, knotted or braided grass (shiba) is placed in various parts of the house. In some houses, bunches are suspended from the cross beams, perhaps three or four bunches to the side. They may be placed in the toilet, at the entrance to the house compound, on the water barrel in the kitchen, on the front and back of fishing boats, or in the interior of the house. Blades of miscanthus grass may be tied around the neck of a bean paste jug (misogami). Spirits, plentiful at this time, are frightened away by the patches of grass and will not enter. The young, while not believing in this, acquiesce to avoid making the old angry.

When a death anniversary is being celebrated, there may be a blade of miscanthus, a rice straw, or a knotted blade of grass on the top of a box of candles or sweet meats to prevent the intrusion of evil spirits. A blade of grass (the san) is occasionally tied around the handle of a tea pot. For the first week after a family death, tea is served from a pot which has this blade of grass. But these are almost invariably the observances of the old and are only infrequently seen. These customs, observed in Minatogawa, are said to survive among the very old in the other villages.

In Matsuda, a rice rope (shimenawa) was observed at one home. The rice rope, a Shinto symbol, is not common in Okinawan culture. This

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rope was hung across the entrance of the family compound two times a year, on the 9th day of the 8th month, and on the 8th day of the 12th month. Along the rope, there were knotted blades of grass, also the san plant. The purpose is to frighten away evil spirits and evil doers. One peculiarity of this twisted rice rope is that it is made in a different manner from the ordinary rope. The usual rope is a twist made by rolling the fibre between the palms to the right or away from the body. In this special rope, the roll is reversed and is to the left or toward the body. It is difficult for a person already skilled in the regular method. This villager told of going to two noro priestesses in the village of Yabu who specialized in teaching this method of making ropes. The husband and the wife received instruction, paying about ¥40 for it because the wife believed in the efficacy of the practice. Each year at the proper times, the husband now makes the special rope himself.

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Some fortune telling practices shade into religious beliefs, just as religious customs have also included soothsaying and divination. The noros and the Buddhist priests formerly practiced some fortune telling. There were no fortune tellers in any of the villages studied, but villagers occasionally consult them. Here, too, the patronage comes largely from the old and from the women. Younger people, if they know about them, regard these practices as superstitions unworthy of belief. The word meishin (superstition) is frequently heard among the young in describing customs and beliefs of the old. The sign of the fortune teller (sanjinsō) is the Chinese character for three written three times. These characters are said to signify the three states of existence, pre-natal, the present, and the afterlife, on all of which the fortune teller is well versed. Those in Manashiro and Minatogawa who wish to consult a fortune teller go to Itoman; those in Matsuda go to Nago. The cost is usually from ¥40-50 a visit. Typical reasons for a consultation with a fortune teller are: (1) to find out if an ill person will become well, (2) among the fishermen, to find out if the fishermen will return when an unexpected storm has arisen, (3) to discover if a present unhappiness has been caused by the evil deed of an ancestor and if this can be corrected, and (4) to find out the lucky days for such undertakings as marriages, building a house, or beginning new phases of construction.

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Old women may utter a prayer on seeing a child fall, fearing that the child's spirit might escape because of surprise or fright. (This was observed in Minatogawa).

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In Matsuda, there were shelves for burning charcoal sticks in some of the numerous caves in the area. The nature of the worship could not be ascertained, but they may be offerings to deities of the cave.

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Worship and prayers in the toilet seem to have completely disappeared. There were no personified toilet gods. The toilet apparently was the place in which thanks were given that a place for excrement had been provided. In all the villages, it was said to be an old belief which has now died out. There was no shelf or special place of worship in the toilet.

Table VIII, cont'd.

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Crop	Yield per tan	Tons per acre
Cucumbers	1,570	42.4
Wax Melon	1,859	50.2
Tomatoes	2,789	75.5
Watermelons	1,557	42.0
'I' rush ('Bingo-1')	1,411	38.1
'I' sedge ('Shichitō-1')	1,715	45.3
Tea	197	5.32
Mandarin orange ('mikan')	1,183	31.95
Edible banana	1,529	44.0
Green manure crops	2,994	87.5
Sugar cane (cane weight) ¹	9,000	243.0

Use of Grass, Trees and Brush Southern Okinawa looks barren to the American observer---few trees break the skyline and great fields of long grass cover the hillsides. The comment heard most often is, "Why don't the Okinawans plow up the grass and plant crops, instead of letting all that land go to waste?" The only proper and truthful answer to this query, of course, is that the grass is utilized to the full and that none "goes to waste". 311 31 324

The "ubiquitous miscanthus" referred to by Glacken actually comprises many grasses, chief among which are 'susuku', 'kaya', and one known by the Okinawan name nāichū. 'Susuki' is used mainly for the making of brooms, which occurs in December after the flowering of this grass has turned the countryside from deep green to a cloudy whiteness. 'Kaya' is used mainly for the thatching of roofs, but is also fed to livestock. Among other plants of the wild land, or 'genya', are the 'mogusa' or fūchibā, used for moxibustion and as a vegetable in soups; the hirahāgusa, used to cure leech bites; and the warabinufūnii, or edible bracken fern. [37]

The Japanese butter-bur is found in the 'genya', and is utilized as a tobacco substitute in hard times, and occasionally as food. The flowering ginger, or sannin, furnishes leaves for wrapping rice cakes, and fiber for the tying of bundles of sugar cane. The leaf of the inedible potato or m-bashi (Japanese, 'kuwazu-imo') was used by very poor people before the war as a wrapper for 'misc' paste, which they peddled throughout the countryside. The plant is still used to stop the bleeding of wounds. The lantana---known in Hawaii as "haole-kon"---furnished poles for house roofs, leaves for fodder, and beans for tea during famines. Numerous other grasses and herbs are used by the older generation for medicinal purposes, as can be seen by perusal of Tawada's excellent book, Okinawa Yakuyō Shokubutsu Yakkyō, 2nd edition, Naha, 1951. [376]

Almost all trees, which in Shimajiri means essentially those surrounding the houses, are used in some way above and beyond their major function as windbreaks in time of typhoons. The leaves of the yūna tree are a native

¹ This information is from the Kochinda-son Office.

The leaves of the yūna tree are a native

- 311 substitute for toilet paper, and are still used in some villages, though people
 82 deny that the practice continues. When pressed they may intimate that so-and-
 so, "the poor family over the hill", retains the practice. Banyan trees furn-
 [54]ish leaves for green manure, as do many other varieties. Before the war many
 [17]people grew kuroki for eventual use in the making of samisens. The top of the
 [53]tree was cut when young so that it would become stubby and thick. The neigh-
 boring village of Tsukazan boasts of a samisen-maker whose fame has taken him
 to Naha. The 'kusunoki' tree is considered to be the best tree to plant near
 the home, for it discourages termites.

241 Fertilizers Okinawan farmers in most areas utilize the traditional night soil
 and green manures, as well as the modern synthetic fertilizers.

- [54] Almost every house has two toilets. The one not in use is utilized as a
 night-soil decay pit. Pig manure is mixed with the human excreta, water added,
 [29]and the whole let set for about a fortnight before use on the fields. Use of
 animal manure in the paddies was abandoned with the introduction of the new
 variety of rice. Animal manure produced good heads on the old variety but makes
 heavy stalks only on the new.

- 211 Green manure is extensively used as a plant nutrient in the paddy
 821 fields. Indeed, some paddies in winter are devoted to the raising of green
 manure, which is plowed under before spring planting. Outer leaves of cabbage
 are fed to goats to become manure for the dry fields, or the leaves are
 trampled into the mud of the paddy to decay. Thistles, 'kuvazu-imo' leaves,
 and tree leaves of the yūna and banyan are only a few of the many types of
 green manure. Compost, or 'taihi', is made for the dry fields and some paddies
 by mixing animal manure with 'genya' grasses, rice straw, and other plant re-
 mains. Before the war, compost was not used for vegetables, because it would
 cause a shortage in the amount available for the cane fields. Nowadays com-
 post is more available, and many vegetables assume huge proportions. One
 Nanahan farmer produced a wax melon weighting 97 'kin', or 128 pounds.

- 241 Commercial fertilizers available to the farmers include ammonium sul-
 phate ('ryusan ammoniya', 'ryūan'), synthesized fertilizer ('kasei hiryo'),
 ammonium nitrate ('ryusan kari'), nitrogen-lime ('sekkai chisso'), urea
 ('nyōso'), potassium chloride ('enkakari'), and superphosphate of lime ('Kar-
 insan sekkai'). Ammonium sulphate is preferred for sugar cane. During the
 last four or five years the Agricultural Federation ('Nōren') in Naha has en-
 forced a tie-in sale so that when a farmer buys two sacks of ammonium sul-
 phate, he must also buy one sack of superphosphate of lime. Farmers in
 Tomoyose quite often dispose of the latter by dumping it beside the road, as
 they believe that it is not good for the soil found on their farms. One
 enterprising Nanahan farmer, who for several years was a member of the
 Kochinda-son agricultural committee, enquires about the cast-off fertilizer,
 and when he finds it he uses it to good effect. When he was interviewed con-
 cerning this, he expressed anger at what he considered the backwardness of
 his neighbors.

- [17] Okinawans were first introduced to chemical fertilizer in the mid-
 twenties, when a black fertilizer appeared. This was later replaced by the
 various white products, which since some time before the war have been suppl-
 mented by soybean waste when available.

769 of the child; the child prays several times a year, on the important occasions, at the ancestral tablets of the adopted parent, but otherwise lives as before. The rationale of this practice may be: if one set of ancestors is not sufficient for the child, why not give him another?

753 Also related to the concept ugvambusuku is the notion that certain persons are destined to do more than just make offerings; some are to become 828 kaminchu, "god persons", and play the principal roles at the family worship 794 at the important holidays. If these persons shirk this duty they may become ill as a consequence. In certain persons, particularly older women, persistent illness and especially mental illness may be interpreted as a sure sign that the afflicted person ought to become a kaminchu. There is one well-recognized type of mental illness called 'kami-buri'; the person with this disorder constantly makes the gestures of prayer toward various persons and objects in an extravagant manner. Such a person is almost sure to become a religious practitioner after recovery. In fact some kaminchu positions must be filled by persons who have had 'kami-buri'. The yuta may also receive his, [754] or more often her, vocation through such an illness. (Recently a visiting psychiatrist commented on the low number of cases at the Kin mental hospital. There are of course many cases that are not committed to the institution because Okinawan society has a place for them; they become its psychiatrists.)

Other concepts of disease will be discussed in the next section.

4. Medical Practice

755 Home Remedies There are a number of home remedies that are known to many 757 persons, especially older women. These include the use of certain herbs, the letting of blood, the use of salt, prayer, swearing for exorcism, spells. These methods of treatment may be used by any old woman to the extent of her knowledge, but if the illness appears to be too serious for these treatments a professional medical practitioner may be consulted. However, the distinction between the professional person and the skilled amateur is not always clear.

757 Herbs are used for digestive disorders and particularly for female disorders. Tawada in his description of Okinawan flora¹ lists ten plants 824 used for medicinal purposes, nine of which are said to be useful to female disorders along with a variety of other things ranging from toothaches to appendicitis.

757 Blood-letting is practiced on most infants as a cure for skin eruptions and is sometimes also used on adults. Shallow incisions are made with a razor to let out the "bad blood". These are made on a baby's buttocks and sometimes, though less frequently at the present time than in the past, on the face of an adult.

755 Salt is used for purification. A yuta whom I saw exorcise a house and yard took salt into his mouth and then spit it and threw it in the

¹ Tawada, 1951.